Session I

History of developing scenarios

Case # 1
On July 26th, Mr. Mayberry's top milking Holstein dropped her milk production and began exhibiting signs of respiratory distress possibly due to edema around her neck. One of the milking hands noticed her milk had a pink color to it and pulled her out of the milk line, moving her to the sick pens with three other cows. The cow died suddenly on July 27th. One of the milking barn hands remembered the cow had some bleeding out her mouth and rectum. Mr. Mayberry called in his regular veterinarian, Dr. Whey, to identify why she died. Dr. Whey was able to get to the Dairy by the evening of July 27th. They buried her the next day on the property following instructions by Dr. Whey. Mr. Mayberry's dairy is located in Central Wisconsin.

Questions:

1. What further information do you need?

2. What differential diagnoses would you consider?

3. As Mr. Mayberry's veterinarian, what would your plan of action entail?

Case # 2
On July 26th, two of four laboratory technicians, working the same shift on July 24th, in a small laboratory in a mobile rural clinic, called in sick with signs of malaise, muscle aches and fever.

This mobile clinic takes care of five rural communities in southwest Texas.

Questions:

What further information do you need? Should you be concerned?

What differential diagnoses would you consider?

As the physician responsible for the rural clinic and lab, what would your plan of action entail?

Case # 3
On July 24th, a local sheep producer noticed 5% of her flock died suddenly. The deaths occurred within 36 hours of being moved, on July 22nd, to a plot of irrigated land with grass. The sheep had been moved once the day before from the sheep producer's southern pasture for an interim stay on some rural property in southwest Texas that had some water on it. She was asked to move her sheep from this property because a "high dollar" Livestock Exhibition would be held there from July 24 until July 26. The sheep producer was glad to move her sheep because the vegetation where the Exhibition was to be held was composed mostly of dry spikey grass. After the sudden death of so many of her sheep on July 24th, she was concerned that something on the new green pasture might have caused her sheep to die. She opened up one of the dead sheep that day and put some pieces of spleen, liver, kidney and heart in specimen bags and collected blood from the heart in a red top tube. Her veterinarian had left instructions and the bags and tube on his last visit. She took these to the local rural mobile clinic to be tested as she had done occasionally in the past. She wasn't sure what to ask them to look for.

Within two days, the sheep producer began noticing papular lesions developing on her arms and abdomen and she didn't feel very good.

Questions:

What further information do you need?

What differential diagnoses would you consider? For the sheep? For the sheep owner?

As the sheep producer's veterinarian (who she rarely calls out), what would your plan of action entail?

Case # 4
On July 27th, three of Mrs. Weatherby's eight prize Simmentals, dropped dead suddenly. There were no abnormal external signs noted by the owner on initial inspection of these cattle or the rest of her 50 head of Simmentals. There had been a lightening storm the evening before. A bolt of lightening stuck a tree near the three dead cattle. Mrs. Weatherby decided that lightening strikes are a risk she takes living in Kansas. As a matter of routine, she phoned her veterinarian to come look at one of the three dead cattle. The veterinarian was able to arrive that evening. Mrs. Weatherby had told a local family of ranch hands they could "take away" two of the three dead Simmentals and by evening only one dead Simmental was left for the veterinarian to look at.

Two migrant worker families in Kansas became ill on July 30th. They were rushed to the nearest hospital emergency room with blood emesis and bloody feces.

The local accredited veterinarian, Dr. Toma Thumb of the Sasnak Vet Clinic in Sasnak, KS, was concerned about these valuable Simmental. On July 27th, After initial cursory examination of the carcass, Dr. Thumb decided this was not likely a lightening strike . She was concerned about the untimely death of these previously healthy young cattle and remembered that you are the Foreign Animal Disease Diagnostician (FADD) for this section of Kansas where the Simmental cattle are located. You advise her you can be out to meet her that afternoon and you phone the Area Veterinarian in Charge of Kansas who records the preliminary information you provide and gives you the FAD Referral Control Number # 99FADD01T to identify this case.

Dr. Thumb explains she will meet you at the Simmental Ranch and states that you need to travel north on Hwy 1440 until you reach a fork where you will want to turn left, but turn right almost immediately onto the gravel road which will lead you 5 miles east. You will see the entry posts to the Glamorous Simmental Farms, turn into the farm area and she will be waiting for you in front of the barn to introduce you to the owners, Mr. and Mrs. Weatherby. She has asked you to arrive as soon as possible.

Mrs. Weatherby stated that they had sold their last Alpaca about a month ago and pulled out of the Ostrich business last year when the prices were dropping. She and her husband were enjoying showing and breeding Simmentals and decided, for now, not to have any other animals on the ranch, except for Magnolia, their Irish Wolfhound who stayed in the house most of the time.

Questions

1. As the FADD, what would your plan of action entail?

2. What precautions will you consider as you enact your plan of action?

3. What further information do you need?

4. What differential diagnoses would you consider?

You can now begin completing your FEDS Investigation Worksheet on FAD # 99FADD01T and submit your findings via the FEDS or by FAX.

Session 2

Case # 1
Mr. Mayberry's private practice veterinarian had more calls on July 26th than he had planned for. In his rush, he neglected to restock his mobile truck with a new box of gloves. He decided to help out Mr. M regardless and preceded to perform the necropsy bare-handed. The veterinarian's heart began to sink as he noticed the blood from the cow would not coagulate. His heart plummeted when he saw the markedly enlarged hemorrhagic spleen.

The veterinarian left detailed instructions on burial of the carcass and covering the carcass with lime. He used Mr. Mayberry's barn phone to call the State Veterinarian and report a probable case of anthrax in an area that had no known history of anthrax. The State Veterinarian immediately issued a quarantine for the Dairy and a hold on their milk until a more thorough investigation was possible. The private practice veterinarian's next stop was at his physician's office and he was started on post-exposure prophylaxis right away.

Case # 2
The two laboratory technicians had received tissue and blood samples from a local sheep owner to identify what had caused her sheep to die. The technicians followed preliminary protocol and set up the specimens for culture. They had to put off doing a blood smear until they had a chance to replace the lamp for their microscope that had broken that morning.

On July 28th, the symptoms of the sick lab technicians progressed to dypsnea, increased respiratory distress and chest and neck edema. They were both were hospitalized and started on antibiotics.

This mobile rural clinic was not set up as a BioLevel 2 lab. There was poor biocontainment and adequate safety precautions were not in place.

The other two technicians picked up where their colleagues left off and had picked up the lamp bulb needed for the microscope. On reading the blood smear, large numbers of capsulated bacilli were noted. The rural mobile clinic's physician who had been busy treating patients was called to the lab. Upon hearing the history and seeing the blood smear he phoned the local public health officials and the State Veterinarian who each began their own investigations. Anthrax was diagnosed. He contacted the hospital where his two sick laboratorians were and notified their physician of the diagnosis. Fortunately, they had been put on appropriate antibiotics. The other two technicians had also been started on antibiotics and did not become ill.

Case # 3
On July 26, the sheep producer noticed a ring of vesicles around the papules, which were itching and not healing. She made an appointment to visit her physician who remembered a recent seminar she attended discussing anthrax. The physician inquired about the occupation of the patient and immediately started her on appropriate antibiotics after obtaining a sample of the vesicular fluid for a smear and a sample for culture on blood agar. She took time to listen to the sad tale of the loss of her sheep. After the patient left, the physician reported this as a probable anthrax case to the Texas Public Health Officials, mentioning also the death of the sheep. The Texas Public Health Officials contacted the Texas Animal Health Commission who, after some discussion between them, linked the sick laboratorians to this outbreak.

Case # 4
Mrs. Weatherby's veterinarian became uncomfortable when she stated that the one dead Simmental Mrs. W. kept around had bloated but had not stiffened up after death. The veterinarian phoned and met with you, the FADD, as soon as possible that afternoon for this investigation. Although no one recalled if anthrax had ever been diagnosed on this property, after seeing the Simmental with subcutaneous hemorrhages and bleeding from orifices, both of you elected not to open the carcass. You did make a slit in the Simmental's ear to obtain a blood smear for verification of anthrax.

When you discussed your diagnosis with Mrs. W. and detailed the burial procedures for the carcass, she blanched as she recalled her "gift" of the other two carcasses to a family of migrant workers. You phoned the local public health officials to advise them of this new information. The family of migrant workers who presented at the emergency room were now linked to this anthrax outbreak in the sheep. Most of the family had been treated in time, but one was still in critical condition with toxemia.

The Designated Regional Officer (DRO) has begun to receive not only your FAD investigation, but also FAD investigations of unknown deaths in a variety of cattle and sheep from several states: Oklahoma, Texas, Wisconsin, Kansas, New Mexico, and Colorado. Initial laboratory results from NVSL are pending. The one risk factor they all had in common was attending a Livestock Exhibition between July 24-26 in southwest Texas.

The Public Health Departments in Wisconsin, Texas, and Oklahoma have had recent reports of clusters of human cases of malaise, cough, and high fever. There has been one death linked to this outbreak. Blood cultures have been submitted from some of the cases and will be available in 24-36 hours.

Results:
Blood cultures from the human and animal cases return as positive for anthrax.

Because of the multi-state identification of anthrax infections, within a confined time interval, the Department of Defense has become interested in investigating the biological warfare potential.

Within a week, the Public Health officials, Animal Health officials and DOD developed a map of the locations of the human and animal cases.

The epidemiological investigation noted that a small "Best in Breed" Livestock Exhibition was held from July 24th through July 26th just outside of a rural town in southwest Texas sponsored by a wealthy CEO of a computer company who also enjoyed his status as a champion Angus owner. Specific owners of champion Dairy, Beef, and Sheep breeds were invited to attend. The Exhibition grounds had not been utilized in any official capacity for over a decade. Since it had standing water on it, the site was occasionally unofficially used as a holding area for animals by locals who were moving their animals from one pasture to another. This summer southwest Texas experienced a severe drought, not felt in many years. This drought was interrupted by a succession of torrential storms causing flooding on this property as well as the surrounding area. An old watering hole was filled to overflowing and, although sparse, some vegetation was growing. The hot and dry weather returned prior to the Exhibition dates.

On July 23rd, land grading machines were used to level the ground to erect tents and pens to be used for the "Best in Breed" Livestock Exhibition. Sparing no expense, a well was dug and pipes were laid in the ground in order to efficiently pipe water to the pens and to the tents. Water misters were used in the tents and pens to attempt to dissipate the heat.

Several of the pens abutted the watering hole. The proximity of the watering hole to the pens was appreciated by many of the animals at the Exhibition since the sparse vegetation was slightly more abundant at the water's edge where the water had receded due to the droughty conditions. The loading chute and corrals were placed in an area that had been flooded but was now dry enough to use.

Epilog

After further investigation into the history of this property, it was discovered that approximately 25 years ago, this property had a large number of cattle buried on it who had died of anthrax. Scavenger's had been able to dig up the shallow pits and were able to access the cadavers. Erosion, flooding and excavations for the Livestock Exhibition well and water pipes created an ideal environment to bring the anthrax spores to the surface.

This exercise stresses a number of issues important when confronted with an emergency disease situation including use of the FEDS reporting system, quarantines to stop animal movement, close collaboration of the State Agricultural Officials, the State Veterinarian, the State and Local Public Health officials, Federal Animal Health Officials, the Department of Defense and especially the local physicians, veterinarians and laboratorians.

Many of the cases above also reemphasize, in the situation of investigations of unknown diseases, the need to observe Universal Precautions and to submit samples to appropriate laboratory facilities with adequate Biocontainment Precautions.

Differential Diagnoses - Anthrax
(from "Guidelines for the Surveillance of Anthrax in Humans and Animals")

Cutaneous
Boil (early lesion), orf, vaccinia, glanders, syphilitic chancre, erysipelas, ulcer (especially tropical). These lack edema, characteristic of Anthrax. The absence of pus, lack of pain, and the patient's occupation may provide further diagnostic pointers.

Severe cutaneous forms: orbital cellulitis, dacrocystitis and deep tissue infection of the neck, necrotising soft tissue infections, particularly group A streptococcal infections and gas gangrene, and severe cellulitis due to staphylococci.

Intestinal
Food poisoning, acute abdomen due to other reasons, hemorrhagic gastroenteritis due to other microorganisms, particularly narcotizing enteritis due to *Clostridium perfringens*.

Inhalation
nonspecific "flu-like" mild upper respiratory tract signs
can resemble mild food poisoning